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Before the

Federal Communications Commission
Washington DC, 20554

FCC - MAIL ROOM

In the matter of

Amendment of Part 90 of the
Commission's Rules to Adopt
Regulations for Automatic
Vehicle Monitoring Systems

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PR Docket No. 93-61
RM-8013

To the Commission:

I. Introduction

Uniplex Corporation is a small, privately held company engaged in the research, development and manufacture of spread spectrum radio transceivers. These units serve both as locating devices and digital communication links. Different versions of the transceivers operate under the spread spectrum rules of Part 15 or under the Automatic Vehicle Monitoring (AVM) provisions of Part 90. This company represents a substantial personal investment by its founders.

The Notice of Proposed Rule Making (NPRM) cited above is intended to promote the efficient operation and continued growth of Automatic Vehicle Monitoring systems. In its present form, manufacturers of Part 15 devices operating in the 902-928 MHz band are threatened. It also threatens smaller companies which have invested in Automatic Vehicle Monitoring under the present interim rules.

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A permanent set of rules is needed to accomplish the goal set forth in the NPRM. These rules should consider the impact on the new industry which has grown up around the spread spectrum provisions of Part 15. The rules must be designed to encourage efficient use of the spectrum. The rules should allow small, innovative companies to compete on a level playing field with large corporations.

Uniplex requests that the Commission modify or withdraw the current NPRM. In addition, Uniplex requests the establishment of a joint technical committee to investigate ways of cooperatively sharing the 902-928 MHz band (900 MHz band) among Part 15 users and AVM.

II. Discussion

A. Business and Traffic Issues

1. The Threat to Part 15 Manufacturers

The present NPRM permits the transmission of very high power levels, with no requirement that the power be reduced when high levels are not necessary for operation. This presents the potential for substantial interference with other devices using the same frequencies. This reduces the utility and value of Part 15 equipment, and thus threatens manufacturers that have invested heavily in efficient coexistence in the 900 MHz band.

The present NPRM also has no requirements addressing the susceptibility of AVM systems to interference from other users of the band. This problem is "solved" for licensed AVM users by the priority given them over other users. AVM licensees may, with the help of the FCC, legally

force Part 15 users to cease operation.

2. The Threat to Part 90 Manufacturers

The present NPRM sets aside two 8 MHz subbands within the 900 MHz band for wideband pulse ranging. It also limits the availability of licenses and includes exceptionally generous provisions for grandfathering existing licenses granted under the interim rules. PacTel has acquired several hundred licenses to use one of these subbands in every major city in the

NPRM opens up this service to allow locating of persons or cargo, and this seems to be a natural extension. Permanent rules should address this need.

B. Ranging Techniques

1. Wideband Pulse Ranging

The simplest ranging techniques involve the transmission of a wide bandwidth pulse. Receivers measure the arrival times of this pulse to within several nanoseconds. A reception bandwidth of several megahertz is required to obtain adequate timing resolution, and thus distance resolution.

These receivers have a high thermal noise floor, and are highly susceptible to interference from extraneous signals. To overcome these limitations, it is necessary to transmit a high powered pulse, and others cannot use the same frequency band at the same time.

An AVM company could conceivably serve a large number of customers with this type of equipment. All of the transmitters would be controlled from a single point, and all other entities would be prohibited from transmitting in the same band. The spectrum would be poorly used, and the control requirements could only be met by an enforced monopoly on each frequency band and geographic area.

The intense demand for precious spectrum dictates the use of more efficient technology.

2. Spread Spectrum Ranging

Spread spectrum techniques can provide the ranging resolution advantages of wide band signals without the limitations of wide band

receivers. Matched filters or correlators can lower the thermal noise floor to that of narrow band receivers, so **less transmitter power is required.**

Non-correlated signals in the same frequency band are suppressed in the receiver. The low transmitted power density over the band minimizes interference with other receivers. **Exclusive use of the frequency band is not necessary.**

C. Related Technical Issues

1. Wide Bandwidth

For both pulse and spread spectrum ranging systems, a wider bandwidth **allows more precise measurements.** In a spread spectrum system, a wide bandwidth also improves the performance under multipath conditions. **Less transmitted power is required to overcome Raleigh fading.**

2. Adaptive Power Control

Feedback loops can reduce a transmitter's coverage to exactly what is needed. This drastically reduces the average transmitted power, and **permits more users of the band with less potential for interference.** This may involve adjusting the transmitter power output, the antenna pattern, or both.

3. Communication

Most practical LMS schemes require some communication of control, status and measurement information between points. This data may be modulated onto the same signals used for ranging. It could be transmitted on other frequencies designated for narrow band signals. **No special**

provisions are required for this "forward link".

4. Cost Effectiveness

The costs associated with these advanced techniques are falling rapidly. The newly developing technologies for digital cellular phones, PCS and HDTV all have similar requirements, and we can expect the costs to fall further as these potentially high volume markets mature.

III. Conclusion

In its present form, the NPRM does not require, or even encourage efficient use of the spectrum. It is written in a way that may well permit PacTel to establish a monopoly on the AVM market. It has the potential to destroy an entire industry built around the concept of shared spectrum. Uniplex requests that the NPRM be withdrawn.

Uniplex further requests that a joint technical committee be formed, which includes representatives of both Part 15 manufacturers and Part 90 AVM manufacturers and users. This committee should consider the following issues:

1. Wide band receivers used for ranging should be required to show compatibility with other users of the spectrum. A method of measuring processing gain is required.
2. Narrow band transmission in the 902-928 MHz band should not be permitted, except as allowed under §15.249.
3. Effective radiated power should be limited.

4. Adaptive effective radiated power control techniques should be required for any transmitted power levels exceeding those permitted under §15.247.

5. A mechanism should be provided for coordinating the